

# Coccids (Coccoidea : Hemiptera : Insecta) affecting Fruit Plants in Bihar (India)

BY

S. MOHAMMAD ALI

*Zoological Survey of India, Calcutta*

The Coccids of horticultural importance in Bihar have not received adequate attention. Misra (1923) published a list of these insects then known to occur in Bihar, but in the light of recent systematic studies his list needs revision. The present author made extensive collections of the Coccid fauna of Bihar in the period 1955-1959. An account of the Coccids affecting sugarcane in Bihar has already appeared (Ali 1962); the present communication is a taxonomic enumeration of thirty-four species of Coccoidea that affect fruit plants in Bihar.

This annotated list includes new distributional records of five species from this region. It also gives the distribution of the species in the Orient and particulars of their hosts, together with brief ecological or supplementary notes on some of those forms which the author has collected and observed during the course of his studies. In citing literature only those references have been mentioned which are necessary in tracing the nomenclatorial history of the species under report.

## I. Family MONOPHLEBIDAE

### Subfamily Monophlebinae

#### Tribe Drosichini Morrison

##### 1. *Drosicha stebbingi* (Green)

1902 *Monophlebus stebbingii*<sup>1</sup> Green, Stebbing ; *Dept. Notes Ins. Forestry* 1 : 133.

1903 *M. stebbingi* Green ; *Indian Mus. Notes* 5 (3) : 101.

1928 *Drosicha stebbingi* (Green), Morrison ; *U.S. Dept. Agr. Tech. Bull.* 52 : 169.

1949 *Drosicha stebbingi* (Green), Latif ; *Bull. ent. Res. London* 40 (3) : 351.

Type locality : Dehra Dun, Uttar Pradesh, India.

Host : Sal tree (*Shorea robusta*).

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<sup>1</sup> The spelling of the specific name was emended to *stebbingi* in the errata.

WEST PAKISTAN : on forty-four different host plants which include *Mangifera indica*, *Pyrus malus*, *P. communis*, etc., in Lyallpur, Lahore, Multan, and N.W.F. Province (Khan & Latif 1941, 1945). INDIAN UNION : on Sal trees in Dehra Dun, Saharanpur, and Simla Divisions (Stebbing 1902) ; on *Mangifera indica*, *Tamarindus indica*, and *Ficus* spp. in Madhya Pradesh (Hingston 1929) ; on *Mangifera indica*, *Artocarpus integrifolia*, *Citrus* spp., *Anona squamosa*, *Litchi chinensis*, *Carica papaya*, *Musa* sp., etc. in the districts of Saran, Muzaffarpur, and Darbhanga (Haque 1955).<sup>1</sup>

## 2. *Drosicha dalbergiae* (Green)

1902 *Monophlebus dalbergiae* Green, Stebbing ; *Dept. Notes Ins. Forestry* 1 : 142.

1903 *Monophlebus dalbergiae* Green, *Indian Mus. Notes* 5 (3) : 101.

1928 *Drosicha dalbergiae* (Green), Morrison ; *U.S. Dept. Agr. Tech. Bull.* 52 : 169.

Type locality : Sutlej Valley at elevations between 710 to 1067 metres in the Punjab, India.

Host : *Dalbergia sissoo*.

I observed it in an epidemic form during 1955-1957 at Pusa. It was also found during 1955-1959 in and around Pusa, Muzaffarpur, Motihari, Bettia, Narkitiagunj, Hajipur, and Sonepur in Bihar on *Mangifera indica*, *Litchi chinensis*, *Psidium guajava*, *Punica granatum*, *Citrus* spp., *Achras sapota*, *A. integrifolia*, *Eugenia jambolana*, and other plants. It is usually found from the third week of December to the last week of May in Bihar. In case of severe infestation it may invade any vegetation in its surroundings and the males are of common occurrence in the field. The exuviae of early instars may be found even on railings and brick walls.

During the course of his studies on the new host of *D. stebbingi* (Green) in Bihar, Haque (1955) confused *D. dalbergiae* (Green) with the species *D. stebbingi* (Green). Examination of Haque's collections show that the specific determination by Haque (1955) was doubtful. Some of the specimens from his collections were also forwarded to the British Museum for identification and Dr. D. J. Williams, of the Commonwealth Institute of Entomology, London, remarks : 'this is the penultimate stage of a species close to *Drosicha dalbergiae* (Green). This stage has 7-segmented antennae, the adult female will have either 8- or 9-segmented antennae.' As such the list of host plants reported by Haque (1955) for *D. stebbingi* (Green) is doubtful.

INDIAN UNION : on *Dalbergia sissoo* in the Sutlej Valley (Stebbing 1902) ; on *Citrus* sp. in Uttar Pradesh (Pruthi & Mani 1945), and on a number of other host plants in Bihar as mentioned above.

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<sup>1</sup> See author's remark under *D. dalbergiae* (Green) below.

3. *Drosicha mangiferae* (Green)

1903 *Monophlebus stebbingi* var. *mangiferae* Green, Stebbing ; *Dept. Notes Ins. Forestry* 2 : 332.

1908 *M. stebbingi* var. *octocaudata* Green ; *Mem. Dept. Agri. India* 2 (2) : 16.

1928 *Drosicha mangiferae* (Green), Morrison ; *U.S. Dept. Agr. Tech. Bull.* 52 : 169.

Type locality : Shalimar Gardens, Lahore, West Pakistan.

Host : *Mangifera indica*.

Originally the description of this species was made from males only as the adult females were unknown till then. A collection of Stebbing from *Shorea robusta* in Dehra Dun was described by Green (1903, and in Stebbing 1902) as *Monophlebus stebbingi* in which the presence of three pairs of caudal tassels in the male of this species was the specific character. Another collection from *Dalbergia sissoo* in the Sutlej Valley was designated as *Monophlebus dalbergiae* by the same author (Green 1908, and in Stebbing 1903) on account of four pairs of caudal tassels found in the male of this form. Subsequently, material from a mango orchard of the Shalimar Gardens, Lahore, was described by Green (in Stebbing 1903) as *Monophlebus stebbingi* var. *mangiferae* in which the young females were identical with *M. stebbingi* Green, but the males carried a very small fourth pair of caudal tassels. Later, Green (1908) proposed the name *M. stebbingi* var. *octocaudata* for the same material with a remark : 'differs from male of *dalbergiae* (which also has 8 appendages) in its much smaller size'. Again, Green (1923) published a synopsis of characters for the females of the species *M. phyllanthi*, *M. tamarindus*, *M. stebbingi*, *M. octocaudata*, and *M. dalbergiae* with the comment : 'I have not been able to find satisfactory characters to differentiate the females of *octocaudatus* and *dalbergiae* ; but the males of these two species may be distinguished by their size and by the character of the abdominal tassels'. Morrison (1928) replaced the genus *Monophlebus* by *Drosicha* and suggested the distinctiveness of the species *Drosicha stebbingi* (Green), *D. mangiferae* (Green) [placing *D. octocaudatus* (Green) as a synonym of *D. mangiferae* (Green)], and *D. dalbergiae* (Green) from the Indian region. The characters given by Morrison (1928) are quite helpful in distinguishing the two similar species *D. stebbingi* and *D. dalbergiae*, whereas they are not applicable for the separation of two species, namely, *D. dalbergiae* from *D. mangiferae*.

The finding of Latif (1949) that a great deal of variation takes place, either in the presence or in the development of the fourth pair of caudal tassels, within the males of the same species, and the fact that the two species (*D. stebbingi*, *D. mangiferae*) interbreed freely in nature (Rahman & Latif 1943) are liable to upset the specific status of all the three species *D. stebbingi*, *D. mangiferae*, and *D. dalbergiae*. As such a careful study

of the collections from different localities as well as a check-up of the type specimens are necessary before accepting the conclusions of Khan & Latif (1943) and Latif (1949) that *D. mangiferae* is a synonym of *D. stebbingi*.

*D. mangiferae* (Green) has been considered here, provisionally, as a distinct species, as the author has not seen the type specimen and he does not agree with the conclusions of Rahman & Latif (1943) and Latif (1949), but is of the opinion, on the basis of his field studies, that the species *D. mangiferae* actually refers to *D. dalbergiae*, to which it comes close, rather than *D. stebbingi* as pointed out by Latif (1949). The record of this species from Bihar by earlier workers appears to be of *D. dalbergiae*; the author was not able to collect this species during the course of his studies in Bihar.

WEST PAKISTAN : since Khan & Latif (1941, 1945) considered it as a synonym of *D. stebbingi*, all those hosts which have been mentioned under *D. stebbingi* are common for this species. INDIAN UNION : *Mangifera indica* at Sitamarhi and Dalsingsarai in Bihar (Stebbing 1903); practically on all trees including mango at Pusa, Bihar (Lefroy 1908), and on mango, jak, guava, papaya, citrus, jamun, *Ficus* sp., etc. in the districts of Bhagalpur, Santhal Parganas, Darbhanga, and Muzaffarpur (Sen *et al.* 1956).

#### Tribe : *Iceryini* Cockerell

#### 4. *Icerya aegyptiaca* (Douglas)

1890 *Crossosoma aegyptiacum* Douglas, *Ent. Mon. Mag.* 26 : 79.

1893 *Icerya aegyptiaca* (Douglas), Newstead ; *Ent. Mon. Mag.* 29 : 167.

1896 *I. tangalla* Green, *Indian Mus. Notes* 4 (1) : 7.

1950 *I. aegyptiaca* (Douglas), Rao ; *Indian J. Ent.* 12 (1) : 51 (1951).

Type locality : Alexandria, Egypt.

Host : Fruit trees.

The original home of this coccid is not known, but in 1885 it appeared as a serious pest on fruit trees in Alexandria, from where it was described. Since then it is commonly known as Egyptian mealy bug. In India it was observed by Miss Tomlin during 1892 in Madras, and later Cotes (1896) reported its occurrence from Calcutta. It is quite common in India, and Rao (1950) recorded forty-six different species of plants as its host in India, with a comment that it does great damage to fruit trees like custard apple, jak, sapota, citrus, and guava. He (Rao 1950) further reported its occurrence in Bihar from Rampur (Khas Mahal plantation) only, though Fletcher (1919) mentioned its record from Pusa and Ranchi



as well. I observed it in abundance on mango and guava, causing significant damage at Motihari, Manjhawlia, and Bettiah. It is also fairly common in the districts of Darbhanga, Muzaffarpur, Patna, Gaya, and Ranchi in Bihar on croton, citrus, jak, rose, and *Ficus*, in addition to mango and guava. It is a sporadic pest in Bihar, and usually found from February to August. The males are fairly common during March and April in north Bihar.

CEYLON : on several plants including rose, *Jatropha podagrica*, etc. FORMOSA : on citrus, tea, and many other plants, (Rao 1950). PHILIPPINE ISLANDS : on *Citrus*, *Morus alba*, and *Barleria cristata* (Morrison 1920, Rao 1950). INDIAN UNION : on forty-six different varieties of plants, in Bengal, Bihar, Bombay, Coorg, Cochin, Madras, Mysore, Orissa, and Travancore (Ayyar 1921, Pruthi & Mani 1945, Rao 1950). Further, the author has recently observed it on *Gracinia* sp. at Calcutta, West Bengal, during November 1964. THAILAND : on *Ceiba pentandra* and mango (Takahashi 1942).

### 5. *Icerya pulcher* (Leonardi)

1907 *Palaeococcus pulcher* Leonardi, *Ann. R. Scuola Agr. Portici* 7 (Ser. 2) : 3.

1928 *Icerya pulcher* (Leon.), Morrison ; *U.S. Dept. Agr. Tech. Bull.* 52 : 310.

1932 *Icerya pulcher* (Leon.), Green ; *Stylops London* 1 (2) : 32.

1952 *Icerya pulcher* (Leon.), Rao ; *Indian J. Ent.* 12 (2) : 68.

Type locality : Java.

Host : *Ilex* sp.

Recently it has been recorded from India by the present author (Ali 1962). It was observed only at Pusa, Bihar, on mango leaves from February to July.

SINGAPORE : on *Rhopaloblasta* palm, *Michelia champaca*. JAVA : on citrus, *Mangifera* sp., and rose. PHILIPPINE ISLANDS : on *Guinta* beans. SUMATRA : on orange and coconut (Rao 1950). INDIAN UNION : on *Mangifera indica* at Pusa, Bihar (Ali 1962).

### 6. *Icerya minor* Green

1908 *Icerya minor* Green, *Mem. Dept. Agri. India* 2 (2) : 17 (Ent. Ser.).

1928 *Icerya minor* Green, Morrison ; *U.S. Dept. Agr. Tech. Bull.* 52 : 210.

1950 *Icerya minor* Green, Rao ; *Indian J. Ent.* 12 (1) : 62.

Type locality : Pusa, Bihar, India.

Host : Mango.

INDIAN UNION : on mango at Pusa, Bihar (Green 1908) ; on Citrus and guava in Assam and only on guava at Benares in Uttar Pradesh (Rao 1950).

Tribe : Monophlebini Cockerell

### 7. *Aspidoproctus cinerea* (Green)

1908 *Walkeriana cinerea* Green, *Mem. Dept. Agri. India* **2** (2) : 17 (Nom. nud.).

1922 *Aspidoproctus cinerea* (Green), *Cocc. Ceylon* **5** : 450.

1930 *Aspidoproctus cinerea* (Green), Ayyar ; *Bull. Dept. Agri. India* **197** : 69.

Type locality : Ceylon.

Host : On *Grevillea* sp.

Originally it was collected from *Acacia arabica* in Surat and named by Green (1908) as *W. cinerea* but no description was published till 1922 when he described it from Ceylon as *A. cinerea*.

CEYLON : on *Grevillea* sp., *Citrus* sp., *Terminalia* sp., *Thespesia* sp., etc. (Green, 1922). INDIAN UNION : on *Lawsonia alba* and *Acacia arabica* in Surat (Lefroy 1908, Misra 1923) : on pomegranate, *Lawsonia alba*, and sandalwood, etc., in south India (Ayyar 1921) ; on *Achras sapota* at Pusa, Bihar (Misra 1923).

## II. Family PSEUDOCOCCIDAE

### Subfamily Pseudococcinae

### 8. *Ferrisiana virgata* (Cockerell)

1893 *Dactylopius virgatus* Cockerell, *The Entom.* **26** : 178.

1893 *D. virgatus* var. *farinosus* Cockerell, *ibid.* **26** : 178.

1893 *D. virgatus* var. *humilis* Cockerell, *ibid.* **26** : 179.

1896 *D. dasyliirii* Cockerell, *Jn. N.Y. Ent. Soc.* **4** : 202.

1896 *D. ceriferus* Newstead, *Indian Mus. Notes* **3** (5) : 24.

1897 *D. talini* Green, *ibid.* **4** (1) : 7.

1912 *Pseudococcus marchali* Vayssiere, *Soc. Ent. de France Bull.* **17** : 366-368.

1915 *P. bicaudatus* Keuchenius, *Med. Bez. Proefst. Djemba* **16** : 1-65.

1920 *Pseudococcus virgatus* (Ckll), Morrison, *Philip. Jour. Sci.* **17** (2).

1950 *Ferrisiana virgata* (Cockerell) Ferris ; *Atlas Scale Ins. N. America* **5**.

1962 *Ferrisiana virgata* (Cockerell), Ali ; *Indian J. Ent.* **23** (3) : 236 (1961).

Type locality : Kingston, Jamaica.

Host : On a tree.

The list of host plants of this species in the oriental region is endless and it may be expected to occur on almost any flowering plant. In India

it has been reported from Assam, Bengal, Bihar, Bombay, Hyderabad, Madhya Pradesh, Madras, and Mysore on forty different varieties of plants by Ali (1962). It is one of the common mealy bugs, widely distributed in the districts of Darbhanga, Muzaffarpur, Champaran, and Saran in Bihar. It may be found in different stages of its development, throughout the year clustering upon the terminal shoots, leaves, and fruits of the host plants, like custard apple, crotons, guava, jak, plantain, *Phyllanthus emblica*, aerial roots of banyan, *Ipomoea hederacea*, *Mimosa elengi*, etc. It does considerable damage, especially to custard apple and crotons, from April to September, and often its infestation proves fatal to young plants in Bihar.

CEYLON : on a number of plants (Ayyar 1919, 1921, 1930). FORMOSA : on *Bauhinia* sp. JAVA : probably on citrus (Pruthi & Mani 1945). MALAY PENINSULA : on guava (Takahashi 1950). PHILIPPINE ISLANDS : on a number of plants, including *Anona squamosa* and *Psidium* sp. etc. (Cockerell 1907, Cockerell & Robinson 1915, Robinson 1917, Morrison 1920). INDIAN UNION : on forty different host plants (Ali 1962). INDO-CHINA : on *Albizia* sp. THAILAND : on legume and other plants (Takahashi 1942).

### 9. *Nippaecoccus vastator* (Maskell)

1895 *Dactylopius vastator* Maskell, *New Zel. Inst. Trans. & Proc.* **27** (1894).

1910 *D. perniciosus* Newstead & Willcock, *Bull. ent. Res. London* **1** : 133.

1948 *Nippaecoccus vastator* (Maskell), Zimmerman ; *Honolulu Univ. Press* **464** : 132.

1950 *Nippaecoccus vastator* (Maskell), Ferris ; *Atlas Scale Ins. N. America* : **5**.

1957 *Pseudococcus vastator* ((Maskell), Ali, *Indian J. Ent.* **19** (1) : 54.

1962 *Nippaecoccus vastator* (Maskell) Ali, *ibid.* **23** (4) : 304 (1961).

Type locality : Sandwich Island.

Host : Citrus.

A new distributional record of this species has been established from India by Ali (1957). It is quite common in Bihar from April to November on *Citrus* spp., *Phyllanthus emblica*, *Artocarpus integrifolia*, *Abelmoschus esculentus*, *Gossypium* sp., and *Dalbergia sissoo*, in the districts of Darbhanga, Muzaffarpur, Champaran, Patna, and Gaya. An Aphelinid parasite, *Eriaporus aphelincides* Cam., is an effective enemy of this pest at Pusa, Bihar.

INDIAN UNION : on *Citrus* spp., *Euphorbia* sp., and *Dalbergia sissoo* in Uttar Pradesh (Ali 1957), on tea in Assam (Das 1959), as above in Bihar (Ali 1962) and the author recently observed it on *Citrus* sp. and *Zizyphus* sp. at Calcutta in West Bengal.

**10. *Phenacoccus ballardi* Newstead**

1917 *Phenacoccus ballardi* Newstead, *Bull. ent. Res. London* **8** : 17.

1921 *Phenacoccus ballardi* Newstead, Ayyar ; *Proc. 4th. Ent. Mtg. Pusa* : 334.

Type locality : Coimbatore, south India.

Host : Mango.

INDIAN UNION : on mango at Pusa, Bihar, and in south India (Ayyar 1921).

**11. *Phenacoccus hirsutus* Green**

1908 *Phenacoccus hirsutus* Green, *Mem. Dept. Agri. India* **2** (2) : 25 (Ent. Ser.).

1921 *Phenacoccus hirsutus* Green, Ayyar ; *Proc. 4th. Ent. Mtg. Pusa* : 3.

1958 *Phenacoccus hirsutus* Green, Williams; *Bull. B.M. Nat. Hist.* **6** (8) : 228.

Type locality : not known (probably northern India).

Host : Undetermined.

PHILIPPINE ISLANDS : on *Hibiscus* sp., *Samanea saman* (Morrison 1920). INDIAN UNION : on *Ficus* sp. at Mohol in Sholapur (Kasargode 1914); on *Morus* sp. at Pusa, Bihar, and in Bengal (Fletcher 1919). THAILAND : on *Hibiscus* sp. (Takahashi 1942).

**12. *Rastrococcus iceryoides* (Green)**

1908 *Phenacoccus iceryoides* Green, *Mem. Dept. Agri. India* **2** (2) : 26 (Ent. S.).

1921 *Phenacoccus iceryoides* Green, Ayyar, *Proc. 4th. Ent. Mtg. Pusa* : 3.

1922 *Dactylopius obtusus* Newstead, Green ; *Cocc. Ceylon* **5** : 391.

1954 *Rastrococcus iceryoides* (Green), Ferris ; *Microentomology* **19** : 51.

Type locality : Calcutta, India.

Host : Mango.

It was observed at Pusa on sapota leaves and fruit in November 1956—a new distributional record for this species from Bihar.

MALAY PENINSULA : most common on *Cassia*, cacao, *Cajanus*, *Centrosema*, *Citrus* sp., coffee, *Crotalaria*, cotton, *Derris*, *Gardenia*, *Ficus* sp., *Michelia*, *Mangifera*, *Vitex*, *Phyllanthus*, and twelve other host plants (Takahashi 1950). INDIAN UNION : on a number of wild and cultivated plants in different parts of north and south India (Ayyar 1921), sporadic major pest of *Citrus* spp. in several parts of India Pruthi & Mani 1945) ; on sapota at Pusa, Bihar, as mentioned above.



13. *Centrococcus insolitus* (Green)

1908 *Phenacoccus insolitus* Green, *Mem. Dept. Agri. India* 2 (2) : 26 (Ent. S.).

Type locality : Pusa, Bihar, India.

Host : *Sida cordifolia*.

INDIAN UNION : throughout India on brinjal (*Solanum melongena*) (Fletcher 1919, Ayyar 1921) ; on Cape gooseberry (*Physalis maxima*) at Pusa, Bihar (Fletcher 1921).

III. Family COCCIDAE

Subfamily Coccinae

Tribe Pulvinariini

14. *Pulvinaria polygonata* Cockerell

1905 *Pulvinaria polygonata* Cockerell, *Proc. Dav. Acad. Sci. Iowa*. 10 : 131.

1917 *Pulvinaria polygonata* Cockerell, Robinson, *Philippine Jour. Sci.* 12 (1) : 10.

1920 *Pulvinaria polygonata* Cockerell, Morrison ; *ibid.* 17 (2) : 182.

Type locality : Manila.

Host : cultivated shade-tree.

PHILIPPINE ISLANDS : on orange, *Citrus nobilis*, and shade-trees (Cockerell 1907, Robinson 1917, and Morrison 1920). INDIAN UNION : on mango leaves and shoots at Pusa, Bihar (Misra 1923).

15. *Pulvinaria cellulosa* Green

1909 *Pulvinaria cellulosa* Green, *Cocc. Ceylon* 4 : 262.

1964 *Pulvinaria cellulosa* Green, Ali, *Indian J. Ent.* 26 (3) : 361.

Type locality : Pundaluoya, Ceylon.

Host : Citrus.

Morrison (1920) considered it to be a synonym of *Pulvinaria polygonata* Cockerell. But it has been regarded here, provisionally, as a distinct species on the basis of the identification report of the British Museum, London.

CEYLON : on *Citrus* sp. (Green 1909). INDIAN UNION : only in Bihar on mango (Misra 1923), serious sporadic pest in Bihar on citrus and mango (Ali 1964).

### 16. *Pulvinaria psidii* Maskell

1892 *Pulvinaria psidii* Maskell, *New Zel. Inst. Trans. & Proc.* **25** : 223.

1917 *Pulvinaria psidii philippina* Robinson, *Philippine Jour. Sci.* **12** (1).

1920 *Pulvinaria psidii* Maskell, Morrison ; *ibid.* **17** (2) : 182.

Type locality : Sandwich Island.

Host : Guava (*Psidium*).

In India, it is one of the commonest and most destructive in south India on a variety of plants like guava, mango, coffee, tea, etc. In Bihar, Fletcher (1919) and Misra (1923) reported its occurrence on mango and litchi only, but I observed it on guava also at Muzaffarpur during April to September months. It is similar in appearance to *P. cellulosa* Green, especially after the formation of the ovisac. So far as the author is aware, it has never assumed a serious pest status in Bihar.

CEYLON : on guava, tea (Green 1896). FORMOSA and SUMATRA : on *Citrus* sp. and other plants (Pruthi & Mani 1945). INDIAN UNION : all over India on guava, mango, jamun, loquat (*Eriobotrya japonica*), tea, coffee, etc. (Lefroy 1908, Fletcher 1919, Ayyar 1921, Misra 1923). PHILIPPINE ISLANDS : on *Citrus* sp., *Eugenia jambolana*, *Psidium guajava*, *Ficus* sp. (Robinson 1917, Morrison 1920, Pruthi & Mani 1945). THAILAND : on *Euphoria longana* and *Ficus* sp. (Takahashi 1942).

## Tribe Coccini

### 17. *Coccus discrepans* (Green)

1904 *Lecanium discrepans* Green, *Cocc. Ceylon* **3** : 204.

1961 *Coccus discrepans* (Green), Das & Ganguli ; *Indian J. Ent.* **23** (4) : 247.

Type locality : Pundaluoya, Ceylon.

Host : On Tea plants.

CEYLON : on tea (Green 1904). INDIAN UNION : on mango and banana (*Musa* sp.) in south India (Fletcher 1919, Ayyar 1921); on plantain at Gauhati (Fletcher 1921); on tea at Tocklai (Das & Ganguli 1961); on *Zizyphus jujuba* at Pusa, Bihar (Misra 1923).

### 18. *Coccus mangiferae* (Green)

1899 *Lecanium mangiferae* Green, *Ent. Mon. Mag.* **35** : 249.

1903 *Coccus mangiferae* (Green), Fernald ; *Cat. Cocci. World* : 172.

1904 *Lecanium mangiferae* Green, *Cocc. Ceylon* **3** : 216.

1920 *Coccus mangiferae* (Green), Morrison, *Philippine Jour. Sci.* **17** (2) : 200.

Type locality : Ceylon.

Host : Mango.

CEYLON : on mango (Green 1904). PHILIPPINE ISLANDS : on *Cocos nucifera* (Morrison 1920). INDIAN UNION : on mango at Pusa, Bihar (Fletcher 1919). THAILAND : on *Ficus* sp. (Takahashi 1942).

### Subfamily Ceroplastinae

#### 19. *Ceroplastes ceriferus* (Anderson)

1791 *Coccus ceriferi* Anderson, *Monogr. Cocci Ceriferi Madras*.

1872 *Ceroplastes ceriferus* (Anderson), Signoret ; *Ann. Soc. Ent. Fr.* 2 (5) : 40.

1903 *Ceroplastes ceriferus* (Anderson), Fernald ; *Cat. Cocci. World* : 149.

1920 *Ceroplastes ceriferus* (Anderson), Morrison ; *Philip. Jour. Sci.* 17 (2) 200.

Type locality : Madras, India.

Host : *Celastrus ceriferus*.

CEYLON : on *Antigonon*, *Poutzolzia*, mulberry, tea, *Ficus* spp., etc. (Green 1896, Ayyar 1921). FORMOSA (Pruthi & Mani 1945) ; PHILIPPINE ISLANDS : on *Phytocrene* and *Ficus hauili* (Morrison 1920) ; INDIAN UNION : on tea in Kangra Valley (Atkinson 1889) ; on tea in Assam and Darjeeling (Das & Ganguli 1961) ; on *Lawsonia alba*, *Boswellia*, *Asclepiadron*, etc. in south India ; on *Terminalia*, *Buchananiania*, etc. in Madhya Pradesh (Ayyar 1919, 1921) ; on *Casuarina* in Bombay (Misra 1923) ; on mango, pipal, and arjoon trees in Ranchi, Chota Nagpur, Bihar (Cotes 1891). THAILAND : on *Euphoria longana* (Takahashi 1942).

#### 20. *Ceroplastes pseudoceriferus* Green

1933 *Ceroplastes pseudoceriferus* Green, *Stylop London* 4 (8) : 180.

1959 *Ceroplastes pseudoceriferus* Green, Sankaran ; *J. Bombay nat. Hist. Soc.* 56 (1) : 39.

Type locality : Ceylon.

Host : Undetermined.

This is a new distributional record for this species in Bihar. It was observed heavily clustered upon mango shoots causing considerable damage specially to the seedlings at Motihari during February 1956. Again, in 1957 and 1958, it appeared as a menace to 'Maha Buddha Tree' (*Ficus religiosa*) along with one more unidentified mealy bug at Buddha Gaya in south Bihar. Later it was effectively controlled by the State Department of Agriculture, Bihar.

CEYLON : on undetermined plant (Green 1933). INDIAN UNION : on *Azadirachta indica* and *Diospyros montana* (Green 1935) ; on *Madhuca longifolia* in south India, on *Mangifera indica*, *Ficus religiosa*, *F. glomerata*, *F. bengalensis*, *Artocarpus heterophylla*, *Madhuca indica*, *Mimusops hexandra*, *Terminalia chebula*, and *Holoptelea integrifolia* in Benares, Uttar Pradesh (Sankaran 1959) ; and on *Mangifera indica* and *Ficus religiosa* at Motihari and Gaya in Bihar as mentioned above.

## 21. *Ceroplastes floridensis* Comstock

1880 *Ceroplastes floridensis* Comstock, *Rep. U.S. Dep. Agr.* : 331 (1881).

1880 *Ceroplastes rusci* Ashmead, *Can. Ent.* 12 : 252.

1903 *Ceroplastes floridensis* Comstock, Fernald ; *Cat. Cocci. World* : 152.

1909 *Ceroplastes floridensis* Comstock, (Green 1896) ; *Cocc. Ceylon* 4 : 277.

Type locality : Florida.

Host : ?

CEYLON : on guava, mango, citrus, tea, etc. (Green 1896, 1909). JAVA : on mango and citrus (Green 1900). FORMOSA (Pruthi & Mani 1945). INDIAN UNION : on *Michaelia*, *Anacardium occidentale*, etc. in south India (Ayyar 1919) ; on mango ; minor sporadic pest of citrus, guava, *Ficus carica* in different parts of India (Fletcher 1919, Pruthi & Mani 1945) ; on tea in Assam and Darjeeling (Das & Ganguli 1961) ; and on *Anona squamosa* at Pusa, Bihar (Misra 1923).

## 22. *Ceroplastes actiniformis* Green

1896 *Ceroplastes actiniformis* Green, *Indian Mus. Notes* 4 (1) : 9.

1909 *Ceroplastes actiniformis* Green, *Cocc. Ceylon* 4 : 275.

Type locality : Pundaluoya, Ceylon.

Host : Coconut palm.

It is quite common in north Bihar on mango and guava from April to September. Usually found singly distributed on shoots and leaves in different stages of its development. Once seen on sugarcane leaves (Ali 1962), but this appears to be an accidental host for the species.

CEYLON : on Coconut palm and some other plants (Green 1896). INDIAN UNION : on coconut, mango, etc., in south India (Ayyar 1919) ; on *loranthus* in Poona (Fletcher 1919), on *Ficus carica* at Pusa, Bihar (Misra 1923) ; on mango and guava as mentioned above.

#### IV. Family DIASPIDIDAE

##### Subfamily Diaspidinae

##### Tribe Aspidiotini

#### 23. *Aonidiella aurantii* (Maskell)

- 1878 *Aspidiotus aurantii* Maskell, *New Zel. Inst. Trans. & Proc.* **11** : 199.  
 1881 *A. citri* Comstock, *Rep. U.S. Dept. Agri.* 293 (1880).  
 1881 *A. coccineus* Gennadius, *Ann. Soc. Ent. Fr.* **1** (6) : 189.  
 1887 *Aspidiotus gennadii* (Targioni), Penzig ; *Studi Bot. Sug. Agr.* : 497.  
 1903 *Chrysomphalus aurantii* (Maskell), Fernald ; *Cat. Cocc. World* : 287.  
 1938 *Aonidiella aurantii* (Maskell), Ferris ; *Atlas Scale Inst. America* **III**-179.

Type locality : Sydney.

Host : Orange.

BURMA : on *Citrus* sp. (Misra 1923). CEYLON : On *Agave*, and *Citrus* spp. (Green 1896). FORMOSA : on *Citrus* (Ferris 1921). PHILIPPINE ISLANDS : on *Artocarpus* sp. (Cockerell 1907) and on *Astronia* (Robinson 1917). WEST PAKISTAN : on *Citrus* (Pruthi & Mani 1945). INDIAN UNION : practically common all over India and thrive best in a semi-arid climate. They are usually found on *Citrus* spp., mulberry, *cycas*, rose, etc. (Fletcher 1919, Ayyar 1921) ; on rose and orange leaves at Pusa, Bihar (Misra 1923). INDO-CHINA and THAILAND : on *Citrus* sp. (Takahashi 1942).

#### 24. *Aonidiella orientalis* (Newstead)

- 1894 *Aspidiotus orientalis* Newstead, *Indian Mus. Notes* **3** (5) : 26.  
 1896 *A. osbeckiae* Green, *ibid.* **4** (1) : 4.  
 1896 *A. osbeckiae* Green, *Cocc. Ceylon* **1** : 47.  
 1897 *A. (Diaspidiotus) osbeckiae* (Green), Cockerell ; *Bull. Tech. Ser. 6, U.S. Dept. Agri.* : 28.  
 1898 *A. (Evaspidiotus) osbeckiae* (Green), Leonardi ; *Riv. Pat. Veg.* **7** : 77.  
 1898 *A. (Evaspidiotus) orientalis* (Newstead), Leonardi ; *ibid.* **7** : 79.  
 1908 *A. (Aonidiella) cocotiphagus* Marlatt, *U.S. Dept. Agr. Ent. Tech. Ser.* **16** : 11.  
 1908 *A. orientalis* var. *cocotiphagus* Marlatt ; *ibid. Ser.* **16** : 11-32.  
 1915 *Chrysomphalus pedroniformis* Cockerell & Robinson, *Bull. American Mus. Nat. Hist.* **34** : 107.  
 1938 *Aonidiella orientalis* (Newstead), Ferris ; *Atlas Scale Inst. N. America* : **III**-180.

Type locality : Seven Pagodas, Madras, India.

Host : unknown (probably, a species of *Panicum* grass).



BURMA : on *Ficus religiosa* (Misra 1923). CEYLON : on *Osbeckia* (Green 1896), and on *Atylosia* (Ayyar 1921). PHILIPPINE ISLANDS : on *Vitis vinifera* and *Eriodendron anfractuosum* (Cockerell & Robinson 1915, Robinson 1917). INDIAN UNION : on *Tamarindus indica* and *Solanum melongena* in south India, on coconut palm in Travancore, on rose in Bombay and Poona, on guava and plantain leaves in Madhya Pradesh (Ayyar 1921, Fletcher 1919) ; on *Eugenia jambolana*, *Zizyphus jujuba*, *Tamarindus indica*, plantain leaves, *Melia azadirachta*, etc. at Pusa, Muzaffarpur, and Darbhanga in Bihar (Fletcher 1919, Misra 1923).

## 25. *Aspidiotus destructor* Signoret

1869 *Aspidiotus destructor* Signoret, *Ann. Soc. Ent. Fr.* 9 (4) : 120.

1869 *A. lataniae* Signoret, *ibid.* 2 (4) : 124.

1890 *A. transparens* Green, *Insect Pest of Tea Plants* : 22.

1938 *A. destructor* Signoret, Ferris ; *Atlas Scale Ins. N. America*, *sin*-191.

Type locality : Reunion Island.

Host : Palms and *Psidium guajava*.

CEYLON : on mango, *Ficus carica*, tea, rubber, etc. (Green 1900). FORMOSA : on *Morus alba* (Ferris 1921). PHILIPPINE ISLANDS : on *Mangifera indica*, *Mangifera verticillata*, *Eugenia calubcob*, *Cocos nucifera*, etc. (Robinson 1917). INDIAN UNION : a minor sporadic pest throughout the plains and low hills of the country. Occurs on mango, apple, peach, orange, citrus, jamun, *Zizyphus jujuba*, *Tamarindus indica*, *Psidium guajava*, *Cocos nucifera*, *Phoenix* sp., etc. all over India and on *Cocos nucifera* in Laccadive Islands (Maskell 1896, Green 1908, Fletcher 1919, Ayyar 1921, Misra 1923). INDO-CHINA and THAILAND : on mango and palm (Takahashi 1942).

## 26. *Pseudaonidia trilobitiformis* (Green)

1896 *Aspidiotus trilobitiformis* Green, *Indian Mus. Notes* 4 (1) : 4.

1896 *Aspidiotus trilobitiformis* Green, *Cocc. Ceylon* 1 : 31.

1903 *Pseudaonidia trilobitiformis* (Green), Fernald ; *Cat. Cocc. World* : 284.

1921 *Pseudaonidia trilobitiformis* (Green), Ferris ; *Bull. ent. Res., London* 12 : 218.

Type locality : Pundaluoya, Ceylon.

Host: Unidentified tree.

CEYLON : on leaves of unidentified tree (Green 1896) and on *Dalbergia championii* (Fletcher 1919). FORMOSA : on *Citrus* sp. (Ferris 1921). PHILIPPINE ISLANDS : on *Artocarpus* sp. (Cockerell & Robinson

1915). INDIAN UNION : on unidentified plant in Calcutta (Green 1903), on *Mimusops elengi*, *Ixora* sp., and mango leaves in south India (Fletcher 1919), and only on mango leaves at Pusa, Bihar (Misra 1923). INDO-CHINA and THAILAND : on *Ficus* sp. (Takahashi 1942).

### Tribe Diaspidini

#### 27. *Chionaspis pusa* Rao

1923 *Chionaspis pusa* Green, Misra ; *Proc. 5th Ent. Mtg. Pusa* 348. (Nom nud.).

1953 *Chionaspis pusa* Sp. n., Rao, *Proc. R. ent. Soc. London* (B) 22 (3 & 4) : 62.

Type locality : Pusa, Bihar, India.

Host : *Citrus* sp.

Misra (1923) referred this species under manuscript name, but actually no description was published until Rao (1953) examined its type specimen and described it, provisionally, under *Chionaspis* as originally placed by Green with his (Rao 1953) comment that 'it would require a review of the whole group of species referred to the genus *Chionaspis* to determine exactly the generic position of this species'.

INDIAN UNION : on *Citrus* sp. at Pusa, Bihar (Misra 1923, Rao 1953).

#### 28. *Aulacaspis mangiferae* (Newstead)

1908 *Diaspis cinnamomi* Newstead, *Jour. Econ. Biol.* 3 : 34.

1919 *Diaspis cinnamomi mangiferae* (Newstead), Green; *Rec. Ind. Mus.*, 16 : 433.

1930 *Diaspis cinnamomi mangiferae* (Newst.), Ayyar ; *Dept. Agri. India, Bull.* 197 : 14.

1952 *Aulacaspis mangiferae* (Newst.), Scott, *Microentomology* 17 (2) : 35.

Type locality : East Java.

Host : *Cinnamomum ceylanicum*.

INDIAN UNION : on mango at Bangalore and at Pusa, Bihar (Green 1919, Misra 1923). JAVA : as above.

#### 29. *Lepidosaphes gloverri* (Packard)

1869 *Coccus gloverii* Packard, *Guide to study of Ins. Ed.* 1 : 527.

1872 *Aspidiotus gloverii* (Packard), *ibid. Ed.* 2 : 527.

1938 *Mytilaspis gloverii* (Packard), Ferris ; *Atlas Scale Ins. N. America* : sr-74.

1938 *Mytillella sexspina* Hoke, Ferris ; *ibid.* : sr-74.

1938 *Lepidosaphes gloverri* (Packard), Ferris ; *ibid.* : sr-74.

Type locality : Florida.

Host : *Citrus* sp.

CEYLON : on orange (Ayyar 1921). SOUTHERN CHINA and PHILIPPINE ISLANDS : on *Citrus* sp., (Pruthi & Mani 1945). INDIAN UNION : on mango and croton leaves at Pusa, Bihar (Misra 1923).

### 30. *Parlatoria camelliae* (Comstock)

1883 *Parlatoria pergandii* var. *camelliae* Comstock, *Agr. Expt. Stat. Rept. Cornell* 2 : 114.

1939 *Parlatoria camelliae* (Comstock), Morrison ; *Misc. Pub. No. 344, U.S. Dept. Agr.* : 8.

1945 *Parlatoria camelliae* (Comstock), Mckenzie, *Microentomology* 10 (2) : 57.

Type locality : North America.

Host : Camellia.

JAVA : on mango (Morrison 1939). WEST PAKISTAN : on olive (Misra 1923). INDIAN UNION : on *Aegele* sp., *Azadirachta* sp., *Melia* sp., and *Vitis* sp., in different parts of the country (Ayyar 1921, Morrison 1939), on mango leaves in Rajputana, and only on *Aegele marmelos* at Pusa, Bihar (Misra 1923).

### 31. *Parlatoria oleae* (Colvee)

1880 *Diaspis oleae* Colvee, *Gac. Agr. Min. de Fomento (Spain)*. 14 (2) : 39.

1895 *Parlatoria calianthina* Berlese & Leonardi, *Riv. di Patob. Veg.* 3 : 346.

1897 *Parlatoria affinis* Newstead *Tran. Ent. Soc. Lond.* : 97.

1935 *Parlatoria oleae* (Colvee), Nichol & Wehrle, *Ariz. Agr. Expt. Sta. Tech. Bull.* 56 : 201-235.

1937 *Parlatoria oleae* (Colvee), Ferris, *Atlas Scale Ins. N. America* si-87.

1937 *Syngenaspis oleae* (Colvee), Borkhsenius, *U.S.S.R. Agr. Plant Quarantine, Georgia* : 87.

1939 *Parlatoria oleae* (Colvee) Morrison, *Misc. Pub. No. 344, U.S. Dept. Agr.* : 15.

1946 *Parlatoria oleae* (Colvee), Mckenzie, *Microentomology* 10 (2) : 69.

Type locality<sup>1</sup> : Spain.

Host : Olive.

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<sup>1</sup> Spain *vide* Mckenzie 1946 and Italy *vide* Ferris 1937.

INDIAN UNION : on peach, pears, and plums in Bengal and at Ranchi, Hinoo, Jaganathpur, Kanke, Nankum in Bihar (Rao & Chatterjee 1948).

### 32. *Phenacaspis dilatata* (Green)

1899 *Chionaspis dilatata* Green, *Cocc. Ceylon* 2 : 148 & *Ann. Appl. Biol.* 5 (2) : 46 (1919).

1903 *Phenacaspis dilatata* (Green), Fernald ; *Cat. Cocci. World* : 273.

Type locality : Kandy, Ceylon.

Host : *Eurycles* sp.

CEYLON : on mango, *Eurycles* sp., *Myristica* spp., etc. (Green 1899).  
EAST PAKISTAN : on mango leaves in Dacca (Misra 1923). INDIAN UNION : on palm in Bangalore and Calcutta and on mango leaves at Pusa, Bihar (Misra 1923, Ayyar 1921, Fletcher 1919).

### 33. *Phenacaspis megaloba* (Green)

1899 *Chionaspis megaloba* Green, *Cocc. Ceylon* 2 : 149 & *Rec. Indian Mus.* 16 : 438.

1903 *Phenacaspis megaloba* (Green), Fernald ; *Cat. Cocci. World* : 238.

Type locality : Kandy, Ceylon.

Host : *Psidium* sp.

CEYLON : on *Psidium* sp. and *Actinoclaphne molochina* (Green 1899) ;  
INDIAN UNION : on *Zizyphus jujuba* at Pusa, Bihar (Misra 1923).

### 34. *Phenacaspis vitis* (Green)

1896 *Chionaspis vitis* Green, *Indian Mus. Notes* 4 (1) : 3.

1899 *Chionaspis vitis* Green, *Cocc. Ceylon* 2 : 140.

1903 *Chionaspis vitis* Green, Fernald ; *Cat. Cocc. World* : 286.

1942 *Phenacaspis vitis* (Green), Takahashi, *Rept. Govt. Agr. Res. Inst. Formosa* 81 : 33.

Type locality : Pundulaoya, Ceylon.

Host : on *Vitis* sp.

CEYLON : on *Vitis lanceolaria*, *Elaeagnus latifolia*, and *Loranthus* sp. (Green 1896, Fernald 1903, Fletcher 1919). INDIAN UNION : on *Elaeagnus* sp. and mango in south India ; only on mango at Pusa, Bihar (Fletcher 1919, Ayyar 1921). THAILAND : on undetermined tree (Takahashi 1942).

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